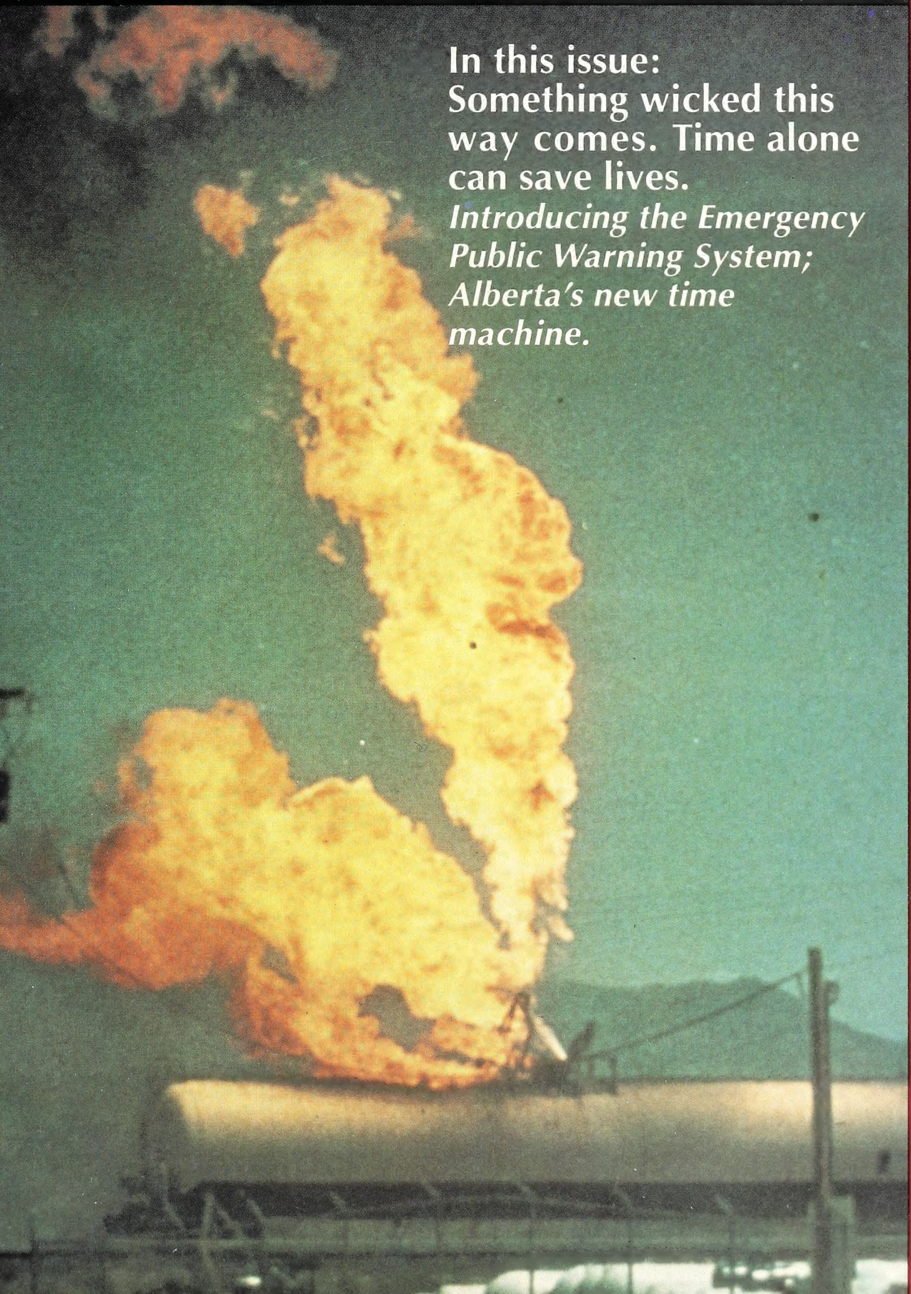
ALBERTA PUBLIC SAFETY SERVICES

SEPTEMBER 1992
Volume 4, Number 3

AL.1.1030
c2

AGENCY INSIGHT



In this issue:
Something wicked this way comes. Time alone can save lives.
Introducing the Emergency Public Warning System; Alberta's new time machine.

In this issue: High-tech texts

Though the articles in this issue deal principally with high technology, the authors are careful not to stress the wizardry that went into the making of the buttons, whistles and bells of new machinery. Our contributors focus instead on the impact of the device on safety enhancement, and on its benefit to emergency responders, who can use all the help they can get to effectively face disaster.

This month we hear from Norm Shaw, a designer who stands alone in an extraordinary specialty (see the story on page 8) and the award-winning Bob Young of Alberta Forestry, Lands and Wildlife (page 12) and his Forestry colleague Tim Toth, "the man from L.R.I.S." (definition on page 9).

The Fire Chief of Strathcona County, Dave Hodgins, graces the pages of *Insight* once again with news about a critical safety issue: shelter vs. evacuation, in the wake of a scientific study published on the issue. Calgary's Coordinator of Disaster Services, Richard de Patie, provides his point of view on the subject.

Oddly enough, one of the principal gadgets on which new-fangled technology relies is the old-fangled telephone. The telephone is a key partner in emerging safety systems, including the Emergency Public Warning System (our cover story on page 6), Dow Chemical Canada's Bigmouth system (page 18), and innovative educational methods, as described by Athabasca University Assistant Professor Dale Howard on page 13.

A big thank you goes this month to the disaster team of Anita Kuzyk and Dave Worman from Fort Saskatchewan, who provided photos from the municipality's recent disaster exhibition.

When *Insight* last heard from Shaun Hammond, APSS' Executive Director of Dangerous Goods, he was asking, "Who's in charge at a dangerous goods incident?" In our call-it-like-you-see-it Viewpoint column (page 16), he follows up on that question. People who enjoy reading magazines from back to front will be rewarded.

A sad farewell

As *Insight* goes to press,we regret to announce the passing of Ray Henderson, APSS' Chief Inspector of Dangerous Goods Facilities Inspectors. Ray joined the agency in 1983 as a Dangerous Goods Inspector, and helped develop policies and strategies needed to regulate industries that were shipping and transporting dangerous goods on Alberta highways.

Ray Henderson's obituary will be featured in the December edition of *Insight.*

Insight is published quarterly by Alberta Public Safety Services (APSS). The publication aims to inform readers about current developments concerning topics which relate to the mandate of APSS: to prepare for, respond to and follow up on man-made or natural disasters in Alberta. This mandate includes activities in the areas of disaster services and management, as well as the handling, offering and transporting of dangerous goods.

Material from this publication may be reproduced providing the customary credits are used. Opinions expressed by individual contributors are not necessarily shared by Alberta Public Safety Services.

Insight is free to residents of Alberta. For people outside Alberta, there is a $21.40 (Cdn) fee, including GST, for mailing and handling for one year (four issues). Please make cheques payable to the Provincial Treasurer of Alberta. To join the *Insight* mailing list, write to the address below.

When notifying *Insight* of a change of address, please quote the subscription number on your mailing label. *Insight* also welcomes contributions, letters, suggestions and comments. Please send to

Insight, Director of Communications
Alberta Public Safety Services
10320 - 146 Street
Edmonton, Alberta
T5N 3A2 (403) 427-2772

Editorial Board
Grahame Blundell
Mark Egener
Shaun Hammond
Ron Wolsey
Judith Hughes

Managing Editor
Grahame Blundell

Editor
Bonnie Lynn Shulman

In This Issue...

4 Shelter vs evacuation
5 Stay where you are!
6 Cover story
8 Communicating in three dimensions
9 How to get land-related data without stepping foot on the land
12 In war and peace, infrared is indispensable
10 Fort Saskatchewan photo shoot
13 Emerging technologies in education
14 Upcoming events
15 Bibliography
16 Viewpoint
18 Bigmouth spreads the word
19 Product Profile

On the cover: Disaster! Now there's a better chance for escape. See our cover story on pages 6 and 7.

Alberta
PUBLIC SAFETY SERVICES

CANADIANA
SEP 28 1992

More "Insight" into extraordinary technology

The Hon. Peter Trynchy presides over the head table at the launch of the Emergency Public Warning System. See our cover story on page 6 for details.

The September 1990 edition of *Insight* was also dedicated to high-tech, was it not?

Yes, and we have dedicated this issue to the same theme because the topic is so pertinent to everything that we undertake in Alberta Public Safety Services (APSS). I would welcome another issue on this same subject next year as well, to present articles about new developments in the field.

We must take advantage of every opportunity to use the latest equipment and tools available. Technological advances have the proven ability to help us prevent and mitigate emergencies, therefore they are instrumental in helping us fulfill our role in Alberta.

Can you explain how APSS is applying high technology to its mandate?

APSS has been in the forefront among organizations which apply the latest technology to all undertakings.

Can you provide some examples?

In 1985 we set up the Coordination and Information Centre (CIC) at our head office in Edmonton. The CIC runs a toll-free hotline 24 hours a day to answer enquiries regarding the safe transportation of dangerous goods, and to activate the provincial response to all emergencies which are called in by emergency response authorities.

The system used by CIC staff is fully computerized, while Canutec, the federal counterpart for reporting of dangerous goods incidents, is not.

How else is APSS keeping up to date with technology?

One innovation is the Hermes project, which is described on page 20. Development of this system is now being completed and will be tied into the Geographical Information System and the Land Use System that will soon be on stream in APSS.

Hermes will enable us to call up the full range of response capabilities, anywhere in the province. When completed, Hermes will have commercial sales potential throughout the world.

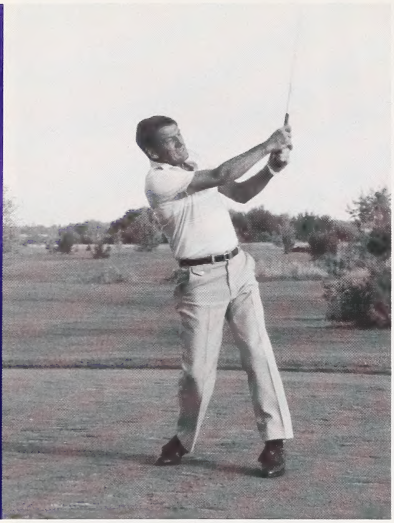
What about systems that would directly affect the general public?

The Emergency Public Warning System pilot program, which became operational in June, is unique in Canada. It broadcasts an emergency message on local radio and television stations. This message, which briefly overrides all programming, is broadcast within three minutes of the activation of this system by an authorized official. The select group of system users are trained to dial an emergency warning into the system using a set of secret telephone numbers.

The Emergency Public Warning System incorporates such highly advanced technology that it would not have been technically feasible only a short time ago. The system is being piloted in the Edmonton region, and if it works as well as is expected, APSS hopes to introduce it province-wide, sometime in the future.

What is the cost of implementing the Emergency Public Warning System?

The total cost to date has been $184,000. The provincial government paid 40 per cent of this amount. The rest was paid by the federal government, which agreed to cost share the project because of its immense value in alerting people to impending threats to their safety.



We fondly remember Rudy Willhauk

Rudy Willhauk, Alberta Public Safety Services' Director of Plans and Operations, passed away on May 5, 1992. He was 56 years of age.

Rudy came to APSS following a distinguished career in the military. He joined the Royal Canadian Air Force as an officer cadet in 1956 and trained as a navigator. Rudy logged in excess of 3,500 hours on the CF100, more than any other navigator in the history of Canada's first line interceptor jet of the '50s and '60s.

In addition to a number of postings in Canada, Rudy served in Germany and Colorado Springs, Colorado. At the time of his retirement in 1983, he was the Commanding Officer, Canadian Forces Base Beaverlodge.

In 1983, Rudy became Disaster Services Division's District Officer in Red Deer. He applied himself to his new career with the same conscientious enthusiasm that he brought to so many endeavours in life. In 1986, he was transferred to Edmonton and promoted to Director of Field Services Branch and in 1988, he became Director of Plans and Operations.

Rudy was extensively involved with a number of volunteer organizations including the St. Albert Association for People with Disabilities, the Minor Hockey Association and a ladies' softball team. He was also an accomplished golfer.

The highly professional manner in which he carried out all of his responsibilities earned Rudy the admiration of everyone with whom he had contact, as well as the friendship and respect of all who had the privilege of working with him. We have lost a very special colleague and close friend.

Insight's deepest sympathy is extended to Rudy's wife, Lorraine, and to all the members of his family.

Overview of a hot topic: shelter vs evacuation

On February 18, 1992, the Energy Resources Conservation Board, in conjunction with APSS, released a technical study on which is the safer alternative: taking shelter in a building or home; or evacuating from an area in which a toxic gas release has occurred.

The study committee used two computer models to compare five situations involving exposure of the population to an H_2S release. The scenarios proved that the hazards of evacuating through a sour gas plume outweighed the hazards of staying indoors. The study also confirmed that if there is enough time to complete an evacuation before a toxic gas cloud arrives, people should be evacuated.

The study, entitled "A Technical Study of Shelter Versus Evacuation when Faced with a Release of Hydrogen Sulphide," is available from the ERCB's Information Services department, located on the main floor, Energy Resources Building, 640 Fifth Avenue S.W., Calgary. (403) 297-3185.

Report from Calgary on shelter vs evacuation

by Richard dePatie, Coordinator
Disaster Services Division
Calgary Fire Department

Shelter vs evacuation is an issue very much in the forefront of disaster planning in the City of Calgary these days. Due to the possibility of a number of hydrogen sulphide (sour gas) wells being drilled on the eastern outskirts of the city, the question on many residents' lips is "what should I do in case of a release of gas?"

Besides having to consider all the other ramifications of response, mitigation, social service and health issues, Calgary risk managers are forced to look at the "what if" scenario of an actual release. We asked ourselves what our priorities regarding evacuation should be.

The study on shelter vs evacuation enabled us to draw conclusions with respect to our somewhat unique situation.

Due to a number of factors involved in the production, exploration and conveyancing of this product, and because of its lethal properties, we have adopted the basic premises of the study.

Its conclusions have been incorporated into our planning process and are being taken into consideration during evacuation procedures not only for H_2S gas but for any toxic gas incident which may take place within the corporate limits of the City of Calgary.

The task of educating the public and in many instances changing the thinking habits of citizens who have been told for years to "get out" may be a more mammoth assignment than having to actually evacuate a portion of the city.

The educational process will be ongoing.Until people reach a perceived comfort level with the committee's conclusions, they will continue to consider evacuation as their only means of self preservation. It is up to the province and the municipalities to advance this study to the public and not to allow it to just gather dust as another technical dissertation.

We believe it could save lives.

Stay where you are!

Strathcona County's emergency plan now includes in-place sheltering procedures.

by Dave Hodgins
Chief, Strathcona County Fire Department

Traditionally, emergency services authorities have advocated evacuation in all types of emergencies - fire, toxic releases, tornadoes or other severe storms.

For many years, the staff of schools, extended care units, hospitals and similar facilities have been trained to evacuate effectively and efficiently in an emergency. To this end, health care professionals, security staff, teachers and students have become extremely proficient and are able to evacuate buildings within minutes.

Now, however, new information shows that under certain conditions, it is actually safer if people seek shelter indoors. A recent report published by the Energy Resources Conservation Board and APSS focuses on H_2S (see page 4), but the results of the study apply to other toxic gases, such as chlorine.

At the best of times, evacuation involves some risk, and that risk is likely to be heightened in an emergency. For example, is it possible to get everyone out safely before the tornado strikes or the wind carries the toxic cloud to the population centre?

In contrast, people may be safely sheltered in place for up to 11 hours, allowing time for a safe evacuation under controlled conditions.

In-place sheltering introduced in Strathcona in 1988

The idea of in-place sheltering was introduced in Strathcona County in 1988, when Strathcona County, along with the Strathcona Industrial Association (SIA), began to promote the concept for residents through the CAER program (Community Awareness and Emergency Response). Residents were given information on the appropriate actions to take as a part of their in-place sheltering procedures. The Strathcona Fire Department worked with the school systems to develop and implement policies and action plans for in-place sheltering.

Keys to planning for in-place sheltering

To develop an in-place sheltering program, consider what we in Strathcona have learned from our experience:

- As with fire drills, in-place sheltering procedures must be tested. The best time for this is in winter when the cold weather makes it difficult to hold fire drills.
- Procedures must be written to ensure that certain actions are followed. For example, for obvious reasons the fire alarm system should not be used to activate the in-place sheltering procedure.
- Consider using a coded message similar to the one used by hospitals ("Dr. Red") to alert individuals responsible for implementation of procedures.
- Individuals in authority must know about the plan and be able to take appropriate action. For example, who will shut down the ventilation system, power and natural gas supply?
- Strathcona County has a centrally controlled communication system to provide instruction to facilities such as schools (orders such as "activate your in-place sheltering procedures") and subsequent updates. Other plans may require people to monitor a predetermined radio channel.
- The plan must include site drawings showing where in the building the occupants will be assembled, and these drawings must be shared with the local fire department in order to assist rescuers in locating occupants if necessary.

As a matter of fact, it would be appropriate for municipal fire officials to promote provincial legislation that would require the implementation and testing of in-place sheltering procedures.

Strathcona is not unique in regard to toxic releases; they can happen almost anywhere - in a backyard, next to a school or hospital, or on a highway. Evacuation remains a viable method of protecting the public if there is enough advance notice. But as an added precaution, responsible administrators in every jurisdiction should plan for emergencies that would require an in-place sheltering procedure. The health and safety of people may depend on it.

TAKE C.A.E.R. WITH EMERGENCY RESPONSE PROCEDURES.

STRATHCONA INDUSTRIAL ASSOCIATION

Remember that you are part of the team, too. Here is what you should do in the event of a spill or an accidental release into the air:

☑ **Call 9-1-1 ★**
☑ Stay indoors. Close all doors and windows.
☑ If outdoors, seek nearest shelter.
☑ Turn off air conditioning, furnace and pilot lights.
☑ Shut off outside air intakes.
☑ Don't operate light switches, clothes dryer, bathroom and kitchen vents.
☑ Stay tuned to radio or television for information and instructions.

Keep this list of emergency response procedures within easy reach.

C·A·E·R·
Community Awareness Emergency Response

★ 9-1-1 is not available in all regions. Have your local emergency number handy. For a free fridge magnet with these tips, call 429-CAER.

ARTWORK COURTESY OF THE STRATHCONA INDUSTRIAL ASSOCIATION

COVER

WE INTERRUPT THIS EDITION
THE FOLLOWING

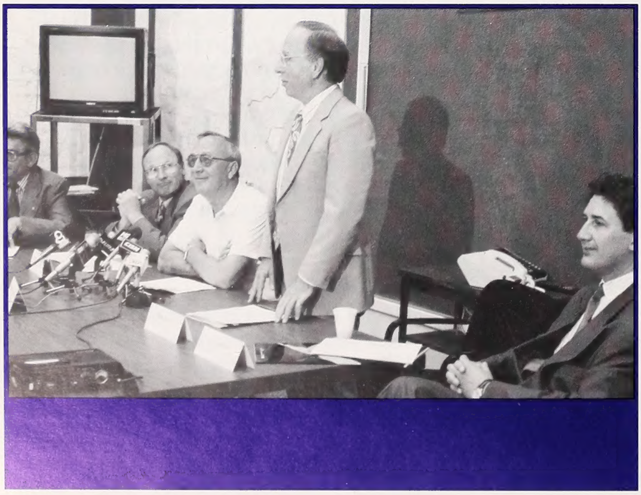
Reporters and their supervisors, as well as Edmonton area safety authorities, get together in the Government Emergency Operations Centre at APSS for the EPWS launch on June 29, 1992.

The Edmonton-area Emergency Public Warning System is now in effect, thanks to the technological capabilities of ACCESS NETWORK CKUA AM/FM, reports Katherine McKee, Access Network Communications Officer.

CKUA is playing an important role in the Emergency Public Warning System by broadcasting warnings from the City of Edmonton and surrounding municipalities from its FM broadcast facilities to all radio, television and cable broadcast outlets in the region.

The system, if it proves to be a success, may be expanded province-wide, with technical support from CKUA's transmitter network.

The system was originally designed by CKUA and APSS staff. A broadcast electronics company developed



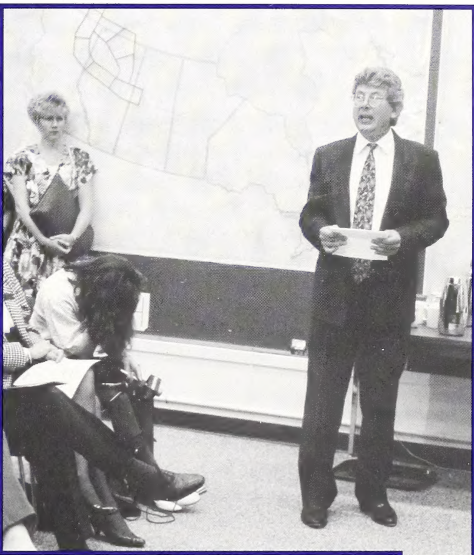
The head table (from left to right): Don Thomas, Acting President and CEO of ACCESS NETWORK, the Hon. Fred Stewart, Alberta Minister of Technology, Reseach and Telecommunications, the Hon. Peter Trynchy, Minister, APSS, Mark Egener, APSS Managing Director, Don Campbell, Assistant Regional Director of Emergency Preparedness Canada, Alberta and NWT region.

It works! Mark Egener, APSS Managing Director, shows off the French version of the EPWS TV signal, designed for APSS by the graphic artists at ITV.

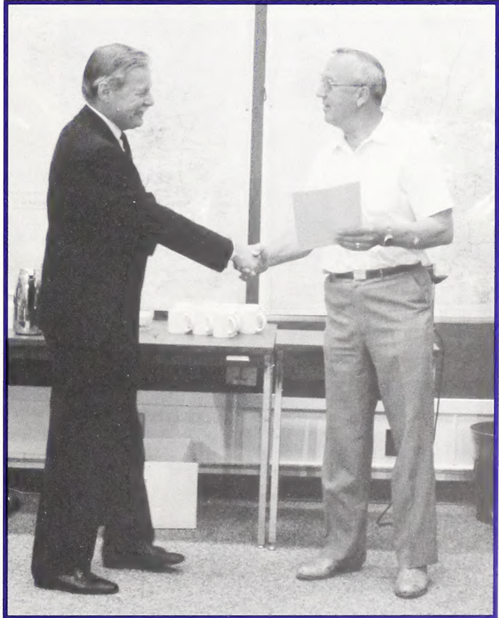
STORY OF INSIGHT TO BRING YOU EMERGENCY MESSAGE

the computer software and special electronic equipment for the project. ACCESS NETWORK Engineering Supervisor Neil Lutes and his staff have spent the last six months fine-tuning the system prior to its official launch.

When disaster looms, municipal officials and AES (the weather office) will contact CKUA and enter a warning message into a digital voice recorder. The message will be transmitted to special receivers located at 15 media broadcast outlets. Regular programming may be immediately interrupted by the emergency message. The whole process will take a matter of minutes to complete. This system is unique in Canada and may be used as a prototype for the development of similar warning networks across the country.



Bruce Davis, General Manager of CHQT radio, thanks the Minister on behalf of Edmonton broadcasters.



The Hon. Peter Trynchy presented a certificate of appreciation to the broadcasters. Here, he thanks Warren Holte, General Manager of CFCW AM and CKRA FM.

Herb Presley (interviewed by ITV's Susan Smitten) is the APSS Officer in charge of the EPWS project.

Communicating in three dimensions

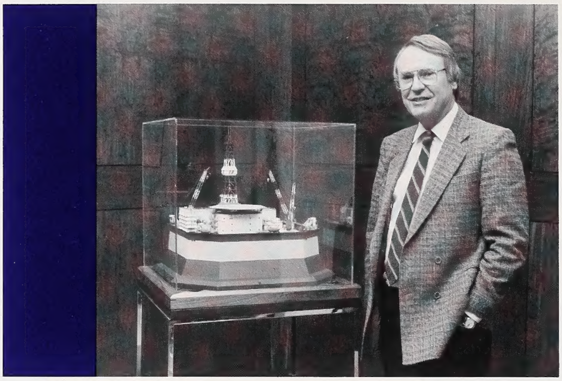
by Norm Shaw
Metal Creations
Bragg Creek, Alberta

Look closely at the photographs on this page and you'll see what I do. I consult with clients to design and create models that are used for historical, educational, environmental and safety studies. Most models are portable and are used to support presentations.

Recently, I lead the design team that built a stand-up oil well display for Gulf Canada. Brian Plesuk of Gulf Canada Resources told me that the display has been very useful at public meetings and trade shows.

"It is a business of perception," he explained. "Traditional tools used to explain oil well safety, such as handouts and verbal explanations, are not as effective. For example, how do you explain a blow-out preventer to a group of area residents?"

Top: This is not the Great Bear River, but a diorama created for Interprovincial Pipe Line Inc. Bottom: A model built for the Canadian Petroleum Association.



Norm Shaw and a model built for a Moscow show.

Representatives from Gulf first contacted me after having seen some of my precision scale models. The company invited me to design and build a display model that would explain well safety and emergency response plans to the public.

My solution was to incorporate a simple working model of a blow-out preventer in a stand-up display, so that people could see how a blow-out preventer actually works, rather than have to reinvent this complicated device in their minds.

The display also incorporates simple graphics and inquiry buttons that show major components of a drilling rig and explains the evolution of a "kick" (an increase in pressure in a well) and how it can be controlled. Actual samples of drilling mud in the display allow people to feel for themselves the difference between mud weights, so they can understand the principle behind the controlling of downhole pressures.

The Gulf display clearly shows the safety precautions the company will take if there is any danger of a blowout. Display viewers are encouraged to push buttons in order to interact with a simulated emergency response panel, which illuminates the company's communication and evacuation procedures via flashing sequential lights.

Many of the models are used to facilitate public education, student training and most recently, to market Canadian technology (my current model of MOLIKPAQ, Gulf's offshore drilling cassion, is in Moscow at an oil show to demonstrate Canadian technological abilities.)

Models can take different forms, from accurate and fully working scale miniatures, to scenic dioramas showing methods of historical and environmental protection, and as in Gulf's display, demonstration of processes and procedures via the combination of graphics with push button enquiry explanations integrated into simplified operating models.

Because they demonstrate precise mechanical engineering workings and integrated safety features, working models can be used as self-explanatory training tools.

When I was approached a while ago by the Canadian Petroleum Association to communicate its Oil Spill Containment and Recovery program (better known as OSCAR), I designed a working river diorama (an actual moving miniature waterway). The model demonstrates the use of containment booms and an oil skimmer, and is used for training oil spill response teams and for public education. The entire process from spill to recovery is clearly demonstrated.

Documented evidence shows that learning and education is enhanced when people can touch, feel and see the material. "Hands-on" demonstrations meet this need for interaction. They also build the student's confidence and the company's credibility by clearly demonstrating the safety and reliability of a company's emergency processes.

As Brian Plesuk of Gulf Canada notes, "Hands-on models are money in the bank."

Obtaining land-related data without stepping foot on the land

by Tim Toth
Alberta Forestry, Lands and Wildlife

(***Editor's note:*** *Imagine a computer system that will not only help authorities create more complete emergency plans, but also help them reply to the toughest media enquiries with a barrage of accurate and astounding data. That system is — almost — here.)*

Introduction to LRIS

The LRIS Network Project, an Alberta provincial government initiative, is a computer system that provides easy, fast access to land-related data through a network of distributed computer systems.

The LRIS Network integrates that data, using the questions "what" and "where", and combines text and spatial data for display to users having the required hardware and software. It is not a geographic information system, but provides access to the most current land-related data available. The efficient access to this data through the LRIS Network will allow for better planning and decision-making by the private and public sectors.

The LRIS Network is being developed in two phases. In Phase 1, land registry, geopositioning and mapping data is being assembled.

In Phase II, to start next year, data from a wide range of application areas such as utilities, facilities (hospitals, schools, industrial sites), land use and assessment will start to be connected to the LRIS Network on a priority basis.

Phase 1, Release 1: available soon

Phase I is being developed in three releases, each one offering more functionality to the user. Release 1 will be available to the business community and all levels of government in the fourth quarter of 1992. Existing products will be provided in digital form for the following information:

- land ownership and encumbrances from land titles;
- leasing and disposition information on surface and sub-surface activities on Crown lands;
- index of registered survey plans;
- geopositioning data.

Release 2: connecting with LRIS

The Release 2 enhancement will support queries using multiple selection criteria and provide direct machine-to-machine access (user's computer to the LRIS Network computer). It will also expand access to other computer systems (Macintosh and UNIX). Users will also be able to make ad hoc queries.

Release 3: special effects

A major change will occur in Release 3. Access to spatial (graphic) data will provide brand new abilities, including the ability to request data graphically (with a mouse). The ability to use spatial data is the key to managing geographic data in the form people most easily and effectively relate to it, in other words, visually.

Faster emergency response

The integration of spatial and textual land-related data will permit text data to be retrieved by identifying a graphic item. For example, if ownership or occupancy data were integrated to a township map, simply "picking" a land parcel would permit the owner or occupant to be identified, along with even the phone number, perhaps.

Good news for municipalities

Municipalities' access to provincial emergency assistance could also include access to information through the LRIS Network — information such as updated maps of the area affected, location of emergency resources and supplies available, and even maps of expected weather changes.

As Release 3 permits access to spatial data, the LRIS Network will take on a much different complexion. Imagine combining the following data to prepare enhanced emergency plans:

- location of homes and businesses to contact
- location of affected utilities
- location of shut-off valves

With their own software, users would be able to determine optimal routes for vehicle dispatch.

Here is also where emergency authorities will get the information to provide to the media when a crisis erupts.

The use of data available through the LRIS Network will reduce data collection and storage costs by allowing access to that data (security permitting). Data will be collected and maintained by the agency responsible, so that data users can focus on working with, not collecting, the required data.

Communications, direction, control and coordination will be put into the hands of those responsible for safety.

Readers: For additional information about the LRIS Network, please contact Tim Toth at 422-1413 (Edmonton).

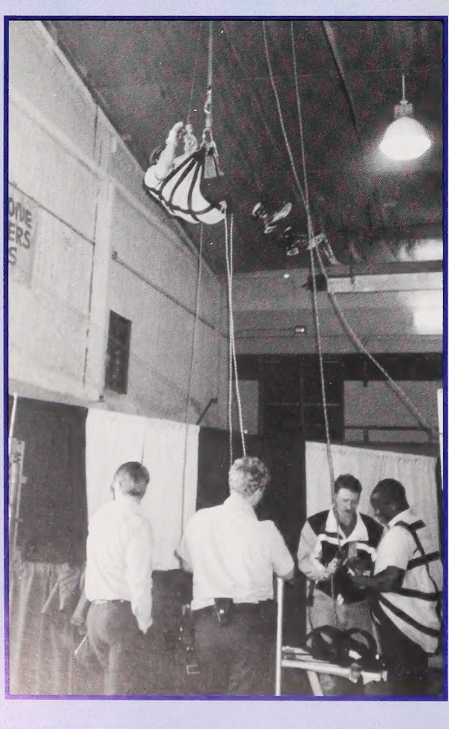
Fort Saskatchewan, a municipality renown preparedness, held a very successful exhi the tools of the emergency trade.

They don't build 'em like they used to

This 1957 Pontiac ambulance was in active service until 1990!

For pint-sized people only

Children were wide-eyed at Superior Ambulance's display of a remote-controlled "talking" ambulance.



The ups and downs of life as a rescue worker

Bears Safety and Rescue personnel demonstrate rappel rescue equipment and techniques with the help of Superior Ambulance staff. This man is hoisting himself up to the ceiling of the arena.

Safe as houses

The Edmonton Fire Department's Safe House is designed to help familiarize children with routes of escape from a smoke-filled house.

d for its ongoing dedication to emergency ition in June to demonstrate for the public

Accident!

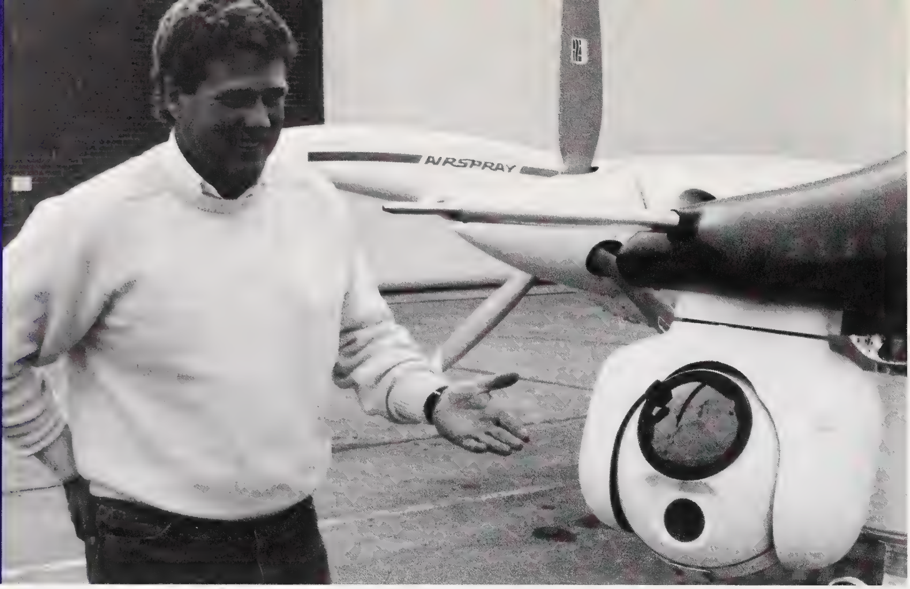
The Fort Saskatchewan Fire Department demonstrates a vehicle extrication using the Jaws of Life apparatus.

The burning bush

Firefighters from the Fort Saskatchewan Industrial and Regional Mutual Aid Organization (a.k.a. Fort MAP) demonstrate "knockdowns" of simulated hydrocarbon fires.

Trucking to the rescue

The Fort Saskatchewan Fire Department RESCUE & HAZ-MAT Unit responds to dangerous goods incidents and rescue operations. It contains the Jaws of Life and other equipment used in vehicle extrication; breathing apparatus; and spill absorbent booms.



Pilot Barry Moore points out the infrared scanner on the "birddog".

In war and peace: infrared is indispensable

by Bob Young
Detection Coordinator
Fire Management Programs
Alberta Forestry, Lands and Wildlife

Ingenuity is red-hot these days in forest firefighting operations in Alberta.

For turning a nighttime reconnaissance technology similar to that used by the U.S. military during the Persian Gulf war into a tool that helps fight forest fires during daylight, the Alberta Forest Service and Forestry Canada have jointly won the 1992 Alberta Forestry Innovation Award. My co-winners are Revie Lieskovsky of the Alberta Forest Service and Chuck Ogilvie of Forestry Canada.

The technology developed is a remote sensing capability using a Forward Looking Infrared scanner (FLIR). Infrared radiation has the ability to "see" through dense smoke during daylight and thereby bring a new degree of accuracy, safety and operational cost effectiveness to the fight against forest fires.

Our innovation was to mount an FLIR scanner on the nose of a birddog aircraft (see photo) which is part of an aerial fire bombing group. The scanner sees through dense smoke, allowing the air attack officer to determine the hottest portions of a fire. This information is relayed to the bomber crews, who then drop water, foam or retardant on the most critical portions of the fire.

In the past, bomber crews were not always able to determine the heart of a fire or isolated spots via visual observation, because their view was obstructed by the dense smoke generated by the out of control forest fire. But now, no smoke, however thick or dense, can obstruct the all-seeing eye of the infrared scanner.

The birddog aircraft is also equipped with a Global Positioning System (GBS) which, using satellite signals, precisely plots the location of the aircraft over the fire. An onboard VCR and thermal paper printer record the infrared imagery and produce hard copy paper prints of the fire activity. The paper print can then be dropped through an in-floor drop tube to the fire boss, who, thanks to this information, is able to more effectively deploy his firefighting resources and crews.

The key to innovation, in forestry as in any field, lies in interagency research. The ongoing cooperation between Forestry Canada and the Alberta Forest Service has already resulted in numerous cost-effective and time-saving equipment and technology developments and both agencies expect many more rewards to come from continued close teamwork.

The "birddog" next to a CL-215 air tanker

Emerging technologies in education

by Dale Howard, Ph.D.
Assistant Professor
Instructional Psychology
Athabasca University

(**Editor's note:** the June edition of *Insight* examined trends in emergency training. In this issue, we look at the application of new technology to training. Due to space limitations, we cannot include the following article in its entirety. To receive the full article, contact the Editor.)

Introduction to alternative views of learning

Most instruction is modelled after the conventional lecture. Someone stands at the front of the class and imparts information. However, with the rate of increase we are currently witnessing in published knowledge, few if any individuals can be considered the sole authority in their field.

Couple this with changing demographics, as more and more students are older and more experienced in their field, and little wonder conventional educational institutions are experiencing difficulty meeting public demands for accessibility and flexibility. Therefore, it is encouraging to see newer perceptions of education which recognize learners as increasingly capable of self-direction, self-learning, and accessing information by themselves.

Much in the way of training and retraining can be met efficiently through alternative instructional strategies, which reach out to meet the learner where the learner is, both physically and intellectually.

For example, thanks to asynchronous instruction, or the delivery of materials and instruction anywhere, anytime, students can take courses without restrictions of time and place.

Several North American educational institutions deliver courses or programs asynchronously. Others send itinerant teachers to remote locations, delivering the program, as it were, on alternate weekends. On the corporate side, more companies offer upgrading, retraining, and further education while the employee is on the job.

Changing our view of education

When we think of technology, we think of modern tools and machines. We think of all the products that assist in human survival and comfort.

Educational technology, in the same vein, conjures pictures of machines such as overhead projectors, spell checkers and talking storybooks. However, if we widen our definition of technology to include more than tools and machines but also methods and ideas, technology can also include the design of educational systems.

A definition

"Educational" technology might be thought of as the tools and innovations that enhance the learning process. Educational technology has been developed to make learning more efficient and more expedient. As the saying goes, "necessity is the mother of invention".

Electronic helpmates in the classroom

Word processors, grammar and style checkers, electronic dictionaries, spreadsheets, calculators, presentation managers, electronic databases, and even electric pencil sharpeners have all brought welcome relief from the many mundane physical tasks associated with schoolwork.

Though tools to assist with the physical tasks of learning continue to make up the vast majority of educational technological applications, we can now add to the list such items as "idea generators" (to help students develop a coherent story line), "report outliners" (to assist in the drafting of technical documents) and "artificially intelligent problem solving systems" (to guide budding engineers in building bridges).

Electronic mediation of instruction

The electronic mediation of instruction refers to any use of electronic equipment to deliver all or part of the training. Research suggests that electronic-mediated instruction, (often referred to as computer-based training) compares favourably with conventional instruction.

The most promising area of this technology enables student interaction with study materials, as in simulations, which provide students with the opportunity to experience the "real thing" without the associated dangers, costs and time inconveniences.

"Intelligent tutoring systems" are yet another innovation. These are learning tools which adjust to the student's learning rate, guide the student through the material and also provide feedback.

Information technology for the information age

Anyone with a computer and minimal communications hardware and software can become "connected" to several large databases and can, through teleconferencing and computer conferencing, attend lectures delivered across the globe. Educators can similarly share ideas and collaborate on projects.

Conclusion

The use of electronically mediated instruction and information technology has removed the walls of the classroom. In many instances, we are not likely to see them raised again. The issue in using alternate teaching techniques and delivery strategies is not to make learning "fun", although that may happen, but to present alternatives that may use other talents and abilities of the student to support learning.

Information is often confused with knowledge. Alternate teaching and delivery strategies are attempts to transform information into knowledge, to make information meaningful. As we approach the year 2000, we will have opportunities to provide students with learning environments rich in content and interaction. As such, educational technology will in all likelihood enjoy a reasonably bright future.

A new initiative from APSS: *Emergency Preparedness Workshops*

The following full-day workshops are intended to

- impart critical information to authorities and specialists
- spark discussion between provincial government emergency authorities and the people they serve
- invent new ways to enhance emergency preparedness

October 9, 1992

Ice Rescue/Cold Water Near Drowning: concentration on medical, technological and risk management issues.

October 28, 1992

Emergency Preparedness in Alberta Schools: a new look at hazard awareness, trauma counselling, coordinating school and municipal emergency plans.

Both workshops will be held at the APSS Training School in Edmonton, but may also be held at a later date in other locations if there is sufficient demand.

To register, send a cheque for $20 per participant, made out to the Provincial Treasurer, to: Workshop Coordinator, Communications Department, Alberta Public Safety Services, 10320 146 Street, Edmonton T5N 3A2. For more information, call 451-7112 (Edmonton) or 1-800-272-9600 (toll-free throughout Alberta) and ask for Bonnie Shulman.

MIACC Events

Bhopal, Seveso, Exxon Valdez and, nearer home, Saint-Basile-le-Grand, are names that evoke thoughts of disaster, and the consequences of the poor management of industrial risk.

Symposium:
Managing Industrial Risks

September 24-25, 1992
Montreal Airport Hilton

The Major Industrial Accidents Council of Canada (MIACC) and the Ordre des ingénieurs du Quebec (Quebec Order of Engineers) present a two-day symposium which addresses this important topic. Focus will be placed on the concept of risk and the application of crisis management.

The all-inclusive fee for the Symposium on Managing Industrial Risks is $350 plus GST. The Symposium will interest engineers, municipal officials, risk assessment experts, industry risk managers, the insurance industry and the emergency preparedness community.

Workshop:
Chlorine Life-Cycle Accident Prevention

November 16-17, 1992
Edmonton

To register or to obtain more information, please contact:

MIACC Tel.: (613) 232-4435;
Fax: (613) 232-4915.

Annual MIACC Meeting

November 3-5, 1992
Toronto, Ontario

The annual meeting of the Major Industrial Accidents Council of Canada (MIACC) brings members and stakeholders together in an annual review of MIACC activities, which strive towards reducing the frequency and severity of major accidents involving hazardous substances.

Plenary sessions and workshops provide the environment in which to hear current progress reports of working groups, and to assess and comment on the work that is being carried out. Some working groups are nearing the completion of their products, and some are newly initiated. All work relates to the prevention of, preparedness for and response to hazardous substances accidents, and will become national standards, guidelines or processes. The working group areas are:

- Risk Assessment Guidelines
- Qualification and Training Standards for Emergency Responders
- Joint Municipal and Industry Emergency Preparedness
- Accidents Trends Analysis
- Buffer Zones and Land Use Planning Guidelines
- Coordination of Information Systems and Emergency Medical Treatment Information
- Emergency Planning for Industry
- Life-Cycle Management of Hazardous Substances
- Chemical Process Safety
- Legislation
- Safety Audits
- Social and Psychological Impacts of Industrial Accidents

The program for this annual meeting has been designed with a mid-morning opening on November 3rd at 10:00 a.m., to allow for same-day arrivals in Toronto. The meeting will close at noon on the last day. Partners are welcome.

More information and registration forms may be obtained from the MIACC office at 600, 265 Carling Avenue, Ottawa, Ontario K1S 2E1. Telephone: (613) 232-4435, fax: (613) 232-4915.

Recent acquisitions in the library:

a selected bibliography of materials available from the Alberta Public Safety Services Library.

Compiled by Teresa Richey
Librarian

We have recently added the APSS Training School video collection to the library's online catalogue. A selection of these videos are included in this list. To borrow material listed, send an interlibrary loan request form to Alberta Public Safety Services Library (AEPS), 10320 - 146 Street, Edmonton, Alberta T5N 3A2.

Airplane crash, simulated exercise [videorecording] : **1990, Edmonton.** Edmonton Fire Department, 1990, 1 cassette (VHS), 15 min., col., 1/2 in.

TL 696 .C6 E35, A/V TRNG

Armenian earthquake [videorecording] : **U.S. rescue effort.** American Heat Video Productions, 1989, (American Heat 3 (8)), 1 cassette (VHS), 15 min., col., 1/2 in.

TH 9445 .T75 P76, A/V TRNG

Crash of United 232 [videorecording] : **Sioux City, Iowa.** American Heat Productions, 1989, (American heat 4 (4)), 1 cassette (VHS), 8 min., col., 1/2 in.

TH 9310.5 .F55, A/V TRNG

Drabek, Thomas E. **The Professional emergency manager : structure and strategies for success.** Boulder, Colorado : University of Colorado, 1987. 274p.

HV 553 .D72 1987, MAIN LIBRARY

Fire management : emergency response plan for an uncontrolled gas release. s.l. : Alberta Forest Service, 1991. 27p.

SD 421.34 .A42 F57 1991 c.1., MAIN LIBRARY

Flash floods [videorecording] : **Sunnyside, Ohio.** American Heat Video Productions, 1990, (American Heat 5 (3)), 1 cassette (VHS), 9 min., col., 1/2 in.

TH 9448 .C43, A/V TRNG

Forest fires [videorecording] : **Manitoba.** Written by David Summerfield. Manitoba Emergency Measures Org. and Emergency Preparedness Canada, 1989?, 1 cassette (VHS), 16 min., col., 1/2 in.

SD 420.73 .M36 F67, A/V TRNG

LaValla, Patrick, et.al. **School disaster planning : a guide for school emergency preparedness.** Olympia, Wash. : Emergency Response Institute, 1991. 177p.

LC 216 .L38 1991, MAIN LIBRARY

LeVine, Richard, et.al. **Guidelines for safe storage and handling of highly toxic hazardous materials.** New York : American Institute of Chemical Engineers, 1988. 119p.

T 55.3 .H3 L48 1987, MAIN LIBRARY

Major hazard control : a practical manual. Geneva : International Labour Office, 1988. 296p.

T 55 .M34 1988, MAIN LIBRARY

Managing natural disasters and the environment : selected materials from the colloquium on the environment and natural disaster management. Edited by Alcira Kreimer and Mohan Munasinghe. Washington, D.C. : World Bank, 1991. 215p.

HV 553. M361 1991, MAIN LIBRARY

Medical waste management and disposal. By the U.S. Environmental Protection Agency, et. al. Park Ridge, N.J. : Noyes Data Corp., 1991. 541p.

RA 567.7 .M44 1991, MAIN LIBRARY

Meteorological aspects of emergency response. Edited by Mark L. Kramer and William M. Porch. Boston : American Meteorological Society, 1990. 119p.

HV 553 .K72 1990, MAIN LIBRARY

Mine rescue drill [videorecording]. American Heat Productions, 1991, (American Heat 5 (10)), 1 cassette (VHS), 12 min., col., 1/2 in.

TH 9445 .H6 H53, A/V TRNG

A Peace of history [videorecording]: **flooding in the Peace Region, June 1990.** Created and produced by Bob McCullough, 1990, 1 cassette, (VHS), 35 min., col., 1/2 in.

HV 610 1990 .M35, A/V MAIN LIBRARY

Phyper, John-David and Bre H. Ibbotson. **The handbook of environmental compliance in Ontario.** Toronto : McGraw-Hill Ryerson, 1991. 346p.

KE 3622 .E5 P96 1991, MAIN LIBRARY

Prugh, Richard W. and Robert W. Johnson. **Guidelines for vapor release mitigation.** New York : American Institute of Chemical Engineers, 1988. 148p.

TD 888 .C5 P78 1987, MAIN LIBRARY

Urban survival [videorecording] : **earthquake awareness in the workplace.** By the British Columbia Buildings Corp. Astroy Film and Video, 1990, 1 cassette (VHS), 12 min., col., 1/2 in.

HV 600 .C36 U72, A/V MAIN LIBRARY

Wildland blazes [videorecording] : **Santa Barbara, Calif.** American Heat Video Productions, 1990, (American Heat 5(2)), 1 cassette (VHS), 17 min., col., 1/2 in.

SD 420.73 .C34 W54, A/V TRNG

Wildland fire training [videorecording] : **parts I-II.** American Heat Video Productions, 1991, (American Heat 6 (5 - 6)), 2 cassettes (VHS), 20 min., col., 1/2 in.

SD 421.32 .C3 p. 1-2, A/V TRNG

Viewpoint

by Shaun Hammond
Executive Director, Dangerous Goods Division

Over the past two years, a number of articles on emergency planning for dangerous goods incidents, and specifically the issue of "who's in charge" at the scene of a dangerous goods incident have appeared in publications related to the transportation of dangerous goods in Canada (1-6). To date, the situation has yet to be clarified. This particular problem is not one which lends itself to an easy legal, or philosophical conclusion.

Canada, by its very nature, has overlapping jurisdictions in many areas. To search for a single authority is counterproductive in any multi-jurisdictional scenario. In the case of a dangerous goods incident, practice shows that if we strip away the roles, responsibilities and the vested interests of groups in a response situation, well trained, organized, coordinated, authoritative responders work as a team to contain and minimize the effects of the dangerous occurrence.

But is this an issue specific to dangerous goods; one that has no parallel? In reality it is not, but the subject of chemical spills is such an emotive issue that it has been given special status. Kartez and Lindell (7), in discussing planning for both natural and manmade (or technical) disasters, consider that a major handicap to improved emergency preparedness is a failure to learn from one's own experience, and in the context of this discussion, perhaps that should be extended to a failure to learn from the experience of others.

If we define a dangerous occurrence for the moment as a situation that has given rise to an increased risk, or a direct threat to public safety, requiring a response from emergency response forces, what can we learn from other situations that can have direct application to the special case of a dangerous goods transportation accident?

What is being proposed is a bi-directional response system [illegible] purely on the technical issues, being addressed through an Emergency Response Assistance Plan (ERAP) implemented by industry and specialists brought in by the various levels of government, the other a conventional "social issues" response, being addressed by the fire, police and ambulance responders from the local authority. There is little in the current ERAP documentation that leads us to the conclusion that coordination of these two response directions is a primary issue.

The question under these circumstances is whether past experience has confirmed this approach as being appropriate.

The issue of separate command and control functions for the various aspects of a dangerous goods spill has been highlighted by a review of an incident, a fire involving white phosphorous in Casa Grande, Arizona, in 1983. With no overall coordination, some appropriate risk minimization options were not considered, simply because the notion did not occur to the responders in their individual response.

A further conclusion from the Casa Grande incident was that, although highly trained hazardous materials response teams may be available, delays in calling these teams out and the time it could take to reach the incident site, means that local authorities, their response forces and their own community based plan will have to respond to and make critical decisions regarding the event, at least for the initial stages and in many cases, for the duration of the incident (8). Planning, training, exercising and coordination is vital for the community-based plan to succeed.

Certainly the Casa Grande incident points to the fact that a coordinated response might have been more effective. The problems of the large scale response and the coordination of all the responding teams now becomes the focus of the debate as to who is really in charge.

For larger, multi-level responses, additional concerns must be addressed. Theoretical modelling of the communications and coordination process of response to dangerous goods accidents show that the greater the number of responding agencies and organizations, with the added factor that these agencies may be from different levels of government, the more difficult the emergency management process. Without coordination and communication, more is not necessarily better (9).

This is probably best demonstrated through an analysis of the Saint-Basile-le-Grand PCB fire, from which Denis (10) developed the concept of the three categories of issues for disaster management.

Technical issues, raised through dealing with the source of the danger, including firefighting and victim rescue, comprise the first category. The second category consists of sociopolitical issues: social issues involving those activities made necessary by the direct or indirect needs of both the victims of an event and also of the rest of the community, for example, shelter, evacuation, compensation and security of property. Political issues relate to the relationship between the community and its elected representatives during the crisis.

According to Denis, the Saint-Basile event gave rise to a third category: scientific issues. These relate to health risk, and involve sampling, analysis and data interpretation in three specific sectors: environmental, agricultural and human health risks. This third category is a source of uncertainty, and creates a major challenge for the incident management team.

As to specifics of incident command and control, or emergency management, the PCB fire at Saint-Basile presented significant challenges to the response coordinator. Large numbers of responders (Denis interviewed 84 people who "managed" the crisis) turn the disaster management process into the work of a "super task force".

Emergency response management relies heavily on an open process of communication and coordination, a project management approach to the vast number of issues that arise during the response to a chemical spill. Mutual understanding and communications in the coordination group is the one factor that will lead to a successful conclusion of the problem.

It would appear that the analysis of previous incidents is now moving us to the point of emergency site "management and coordination" as the better option over bi-(or multi-) directional response mechanisms under separate command and control structures.

Widely quoted as being one of the best examples of a coordinated emergency response in recent years is the July 1989 crash of Flight 232 in Sioux City, Iowa. Sundberg (11), writing in *Emergency* states:

"During an incident of this magnitude, Sioux City uses an integrated or unified approach to incident command. In this model, the individual sector heads join together at a specified location ... this group becomes the Incident Commander.

...Contrary to the single-person incident command model, which is designed for and works well in a primarily single-sector operation, unified command is most effective in a multiple sector situation. The crash of Flight 232 required simultaneous, high intensity operations in fire suppression, patient care and transportation, security and traffic control, resource procurement and mortuary operations. To expect one person to be omniscient in all these sectors is beyond comprehension under any circumstances."

In relation to the emergency planning process, the Sioux City Disaster Planning Committee, comprising officials from city and county government, private industry, and local elected representatives or their staff, has a range of responsibilities which, at the accident site, provided the members with a clear understanding of each sector's capability and role in a disaster situation, and has "fostered respect and cooperation" which makes the unified approach to disaster management so successful.

In reviewing the same incident, Charles and Settle (12) conclude that the four characteristics of a good plan are:

1) the plan must be incorporated into normal routine training on a regular basis by agencies;
2) multi-agency cooperation and communication must continually exist;
3) planning must have training, testing and updating;
4) the plan must be flexible and short enough to be understood by all.

Charles and Settle also conclude that the most important aspect of the Sioux City emergency effort was the effort to incorporate responders within the community into the planning effort.

The fact that we continue to debate the question of "who's in charge" tends to suggest that we have yet to learn from our own experience and the experience of others.

In reality, the emergency planning process in Canada does recognize the fact that the local authority has the primary role in the response, and that the coordination and communications is based on the principles of emergency site management, essentially a Sioux City "unified" approach. Certainly at the local authority level there is no question of site management and "who's in charge".

I hope that the recent amendments to the Federal Transportation of Dangerous Goods Act (13), particularly the requirements for emergency response assistance planning, take into account the lessons learned from past experience.

When the standards for the ERAP process are developed, the concepts that worked so well at Sioux City should be included, particularly the recognition of the primary role the local authorities and their response forces play in the response process, and how the response assistance plan can or should integrate into the local emergency plan.

The ERAP standards must bridge the communications gap between expert responders and the local authorities response management team, and deal with all issues by way of a unified, community-based response management process. One has also to endorse the concept of additional expert response to "assist and advise the municipal and provincial authorities" (14).

The ERAP process must build from the basis of a community based response, recognize that on-scene coordination rests with the local authorities, and that additional response resources will be activated by way of mutual aid plans, provincial support plans and industry-based special response teams. Industry should be encouraged to integrate their response assistance plans with the community-based plans in those areas through which their products travel.

In Alberta, the community planning process is well established. Moreover, after considerable consultation between local and provincial government departments and industry, the provincial government has put in place a dangerous goods support plan. This plan integrates expert resources into the community based plan for the response to dangerous goods incidents.

Combined with comprehensive emergency site management training programs for responders, the response systems in place in the province are developing along the lines of the coordinated approach which can only benefit from an ERAP process which recognizes local coordinated response and blends with the community based plans.

In the long term, the public will be better served by a flexible process that can react to local organizational structures. This process should be integrated, consensus-based emergency site management, rather than a separate multi-directional response process, which, by its very design, sets up parallel responses with very different objectives.

References

1 Ladouceur, E. "Planning, the key to reducing risk: Emergency Response Assistance Planning (Part 1)" Dangerous Goods Newsletter 9(1):6, Spring 1989

2 Heath, B.K., "Planning, the key element of a sound Emergency Response Assistance Plan" Dangerous Goods Newsletter, 9(2):8 - 10, Summer 1989

3 Read, J.,"Who's really in charge" Dangerous Goods Newsletter, 11(1):3, Spring 1991

4 Ladouceur, E., "Roles and responsibilities at DG accident sites" Dangerous Goods Newsletter, 11(1);4-6, Spring 1991

5 Heath, B.K., "Emergency response planning process" Dangerous Goods Newsletter, 12(1):11-13, Spring 1992

6 Mahmud, K.H. and Field, D.H., "Who is in charge? A common law perspective", Dangerous Goods Newsletter, 12(1):8-10, Spring 1992

7 Kartez, J.D., and Lindell, M.K., "Planning for uncertainty", J. Amer. Planning Association, 54(4):487-98, 1987

8 Charles, M.T., and Kim, J.C.K, ed., "Crisis management: a casebook", (Springfield, Illinois, Charles C. Thomas, 1988) pp. 43-63.

9 Toulmin, L.M., Givans, C.J., and Steel, D.L., "The impact of intergovernmental distance on disaster communications", Int. J. Mass Emergencies and Disasters, 7(2):116-132

10 Denis, H; "The complexity of technopolitical disaster management: technical, sociopolitical and scientific issues", Industrial Crisis Quarterly, 5 (1991):1-18

11 Sundberg, Charles; "The right stuff", Emergency, 22(8):30-33, August 1990

12 Charles, M.T., and Settle, A.K, "United Flight 232: Sioux City's response to an air disaster", Industrial Crisis Quarterly, 5 (1991):77-90

13 Transportation of Dangerous Goods Act (1992)

14 Grange, Samuel G.M., "Report of the Mississauga railway accident enquiry", Government of Canada, 1980

15 "Government of Alberta Support Plan for Dangerous Goods Incidents", Alberta Public Safety Services, 1991.

BIGMOUTH spreads the word

by Charlene Elliott
Dow Chemical Canada Inc.

(***Editor's note:*** *Imagine the phone ringing just as you sit down to a late supper after an exhausting day. You choose not to answer the phone, figuring with a tired sigh that whomever it is will call back later. But the phone rings and rings until finally you do get up to answer it. The voice at the other end is one you've never heard before, but before you know it, the voice is giving you instructions and insisting that you follow them...now there's a definition of a bigmouth. Read on as Charlene Elliott explains the advantages of being targeted by one*).

Most accidents are preventable. Even the risks and effects of those that do occur can be minimized. This mind-set has inspired car manufacturers to supply seatbelts and air bags in vehicles.

Preventing accidents and minimizing the impact of any that do occur is a cornerstone of environment, health and safety programs at Dow Chemical Canada Inc. Despite the chemical industry's impressive safety record, Dow's philosophy is that no company can be too cautious in regards to safety measures. That is why Dow develops and regularly tests procedures for responding to any emergency.

Dow's Western Canada Division (WCD) in Fort Saskatchewan (a municipality neighbouring Edmonton) has taken many emergency planning measures to protect Fort Saskatchewan residents in the event of an accidental chemical release. For example, Dow works closely with the city on updating its Emergency Response Plan.

While this initiative has always been helpful, it wasn't quite comprehensive. Residents who did not live in Fort Saskatchewan but who were nevertheless located within a two-kilometre radius of the plant site did not have access to the same level of emergency response preparedness as city dwellers. This situation prompted Dow to find a way to augment the emergency response plans to include everyone residing in close proximity to its plant.

The solution was BIGMOUTH.

BIGMOUTH is the nickname for the software package that runs Dow's "Offsite Notification System", which is a telephone network run from a personal computer. In the event of a serious emergency, BIGMOUTH dials preprogrammed phone numbers, advises residents of the problem, and provides information on what to do next.

When activated, BIGMOUTH contacts all residents within a two-kilometre radius of Dow (excluding those within the city limits of Fort Saskatchewan) in 15 minutes maximum. The software program continuously phones until someone answers the telephone and acknowledges the call.

BIGMOUTH serves more than 60 residents of Fort Augustus, a small community across the North Saskatchewan River from the Dow plant site. The system would begin calling people in the event of a massive chlorine release from the company's chlor-alkali plants. The system only warns people about chlorine releases because that is the chemical Dow handles in quantities large enough to pose a potential threat to the health and safety of individuals living offsite.

True, BIGMOUTH provides protection above and beyond legal requirements, but Dow believes it is the right way to do business today. "The Offsite Notification System has helped strengthen communication between local residents and Dow," explains Terry Leigh, Production Manager and Chairman of Dow's Emergency Procedures Committee. "They are less wary of expressing concerns to us."

Only one incident at WCD would ever have required off-site notification, and that was 25 years ago. Plant design and operating procedures have improved to the extent that the chances of such an incident occurring today are virtually eliminated. BIGMOUTH's central function, then, is to provide just that extra bit of security that lets Dow's neighbours breathe a little easier and experience increased peace of mind.

Product Profile

MTBE

Better known as Methyl tert-butylether, MTBE may not be as well known as chemicals like asbestos or alcohol, but it is already on the way to having a profound effect on both the population and the environment of North America.

Why? How? What can MTBE do for the population? For the environment?

Here, to help answer these questions, is:

A brief history lesson

Gasoline, produced in a refinery, is a blend of various alkanes (simple molecules composed of hydrogen and carbon), but if used "as is" in a car engine, it would cause the vehicle to sound as though there were a series of hammers under the hood all banging at once. This is what is called "engine knock".

Until the 1970s, tetra-ethyl lead (TEL) was the only anti-knock agent used. But TEL produced harmful by-products from combustion and was legislated out of gasoline. The primary substitute, which goes by the jaw-cracking name 2-methylcyclopentadienyl manganese tricarbonyl (or MMT for short), was found to be less harmful but still environmentally damaging. To meet the requirements of the legislation, a more environmentally friendly product had to be found. That product turned out to be MTBE.

The inclusion of oxygenates (products which contain available oxygen) to fuels has been known for some time to provide cleaner, more efficient combustion with cleaner exhaust; MTBE is one such oxygenate. Currently undergoing test-marketing are two others: ethanol and methanol.

Like its predecessors TEL and MMT, MTBE enhances the octane rating of gasoline and creates a fuel mixture that does not explode in the cylinders before the pistons reach their ideal point. In other words, pre-ignition or knocking is eliminated.

For the population and the environment, the primary effect of MTBE is a reduction in heavy metals (lead or manganese) in vehicle exhaust and also less pollutants to affect human health.

Properties of MTBE

MTBE is an ether compound with the molecular formula C5-H12-O. It has a vapour that is heavier than air; thus it has both a tendency to creep along flat surfaces and also to collect in low spots. It is flammable with a flash point of -2.6 C. With this combination of properties, the product requires respect when handling or transporting. Care must be taken to avoid spills, especially into sewers or along surfaces where there are ignition sources which could lead to dangerous flash-back fires or explosions.

Recommended emergency firefighting media are dry chemical, carbon dioxide, halon, water spray or alcohol foam; for larger fires water spray, fog or alcohol foam are advised.

Methyl tert-alkyl ethers, of which MTBE is one example, are relatively stable products. Unlike most common ethers they do not form peroxides upon prolonged storage or exposure to light, thereby reducing the risk of detonation found with other ethers. MTBE should be stored in cool areas and in metal containers. To prevent ignition from an electrostatic discharge, the metal containers should be electrically grounded. They should not be allowed to come in contact with oxidizers. Electrical equipment for use in an area where ethers are used must be explosion-proof.

Other physical properties are:

Freezing point (C)	-108.6
Boiling point (C)	55.2
Flash point (C); closed cup	-2.6
Lower flammability limit (%)	1.6
Upper flammability limit (%)	8.4
Autoignition temperature (C)	435
Vapour density (Air = 1.0)	3.1
Odour threshold (ppm)	0.02- 0.05

MTBE is manufactured in several ways, for instance:

- by the catalytic reaction of methanol and iso-butylene at elevated temperatures and pressures
- by thermal steam cracking of iso-butane, giving MTBE and iso-butylene
- by catalytic conversion of methanol, hydrogen and C4/C5 feedstock

These same feedstocks can also produce intermediate products for the manufacture of pesticides and detergents.

There are at least eight principal licensed manufacturing processes for MTBE in operation around the world. One is now operational in Sherwood Park.

The principal market use of MTBE is as a gasoline octane enhancer. Amounts added will vary according to the untreated gasoline octane number and the octane number required. The maximum found in gasoline is 7%. Transportation modes include pipeline, road, rail and marine. Dangerous goods documentation must show the following:

Shipping name	METHYL tert-BUTYLETHER
Classification	3.1
PIN	UN2398
Packaging Group	II

ISSN 0843-4700

Alberta
PUBLIC SAFETY SERVICES

P.O. Box 10,000
Edmonton, Alberta T5J 2P4
If undelivered, return to the above address.

MAIL POSTE
Canada Post Corporation / Société canadienne des postes
Postage paid Port payé
BLK Nbre
Edmonton, AB
Permit No. 4212

Hermes' Hermits

With Hermes for a sidekick, APSS Duty Officers are more independent than ever

Hermes is a computer product to be installed at APSS headquarters when completed. It will serve as companion to the rotating roster of APSS officials responsible for responding to incoming calls for information or response to spills or leaks of dangerous goods or hazardous materials on Alberta roadways.

Developed with the support of APSS, the Alberta Research Council, Emergency Preparedness Canada and Syncrude Canada Ltd., Hermes (Heuristic Emergency Management Expert System) obtains the information a responder needs, with just the click of a computer mouse.

Without Hermes, the APSS Duty Officer must make phone calls, obtain maps, consult reference books and procedure manuals and query computer databases, in order to respond to many requests for information.

Hermes, however, will draw on its storehouse of Alberta maps, chemical property databases, emergency response manuals and a weather satellite connection to perform all the above tasks, and also alert the user to similar previous situations.

The Hermes substance identifier uses any information the caller may provide to identify the leaking or spilled substance and eliminate those which are not consistent with the data.

Similarly, Hermes' location analyzer narrows down the possible locations of the incident once information is input as to place of origin of the incoming phone call, and displays appropriate resource information for the area.

In addition, Hermes provides instant risk analysis when substance and location data are entered into the system by the user. Hermes' time analyzer informs the user of seasonal risk factors.

Hermes is an expert assistant, not an expert. Emergency responders with the training, skills and wherewithal to use all the tools at their disposal, including Hermes, will always be the real experts.